

IDENTIFYING PREDICTORS OF  
CHIROPRACTIC OUTCOMES

by

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**ABSTRACT**

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Identifying Predictors of Chiropractic Outcomes

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Systematic reviews have identified several of the most consistent predictors of chiropractic outcomes across studies, but researchers have not integrated these factors into a single investigation. In addition, research on general health status and disease-specific questionnaires in patients with back problems has been somewhat contradictory in the past. A pre-post test research design was implemented in this study. The results of this research, using stepwise regression and partial correlation analyses, suggest that co-morbidity, initial measure of disease, working in a service occupation and previous visits to other health care providers best predict short-term outcomes in chiropractic care. Also, the results reveal that the SF-36, a general health status questionnaire, is not adequate to predict disease specific change in patients' function over time.

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## **CHAPTER ONE**

### **STATEMENT OF THE PROBLEM**

The primary purpose of this study is to identify the predictive factors for short-term outcomes in chiropractic care. The secondary purpose of this study is to further evaluate the role of generic measures of quality of life in the assessment of chiropractic care.

The inability to predict outcomes in patients with low back/neck pain leads to inappropriate or unnecessary treatment by chiropractors (Skargren & Oberg, 1998). Several studies have investigated specific predictors in chiropractic care outcomes, but almost none of the past research has combined previously identified significant predictors to determine the most important predictive factors in chiropractic outcomes. These predictors include such factors as duration of current episode, previous back problems, occupation, expectation, co-morbidity, gender, age, and depression (Skargren & Oberg, 1998; Burton, Tillotson, Main & Hollis, 1995; Bronfort & Bouter, 1999; Polatin et al., 1988; Leclerc et al., 1999; McIntosh, Frank, Hogg-Johnson, Bonbardi, & Hall, 2000; Burton & Tillotson, 1990; Katz et al., 1999; Radanov, Sturzenegger, & Di Stefano, 1994; Bendix, Bendix, & Hastrup, 1998). The effects of these factors were measured primarily on such outcomes as general health status, neck and lower back disability, and pain. The aim of this study is to identify, from previously identified significant predictors, the most important prognostic factors predicting disability and improvement at short-term follow-up.

Also, past research shows that specific components of quality of life scores (SF-36) appear to discriminate among patients who improve and those who deteriorate, although not as consistently as the disease-specific measures (Oswestry Disability Index) (Suarez-Almazor, Kendall, Johnson, Skeith, & Vincent, 2000). The SF-36 has been found to be a promising

instrument for measuring health perception in primary health care. Research has shown that the disease-specific Oswestry Disability Index was the most consistent in discriminating among patients who improve and those who deteriorate in chiropractic care. Further research is needed to evaluate the role of generic measures of quality of life in the assessment of chiropractic patients. This study is intended to build on this gap in research and add to the understanding about generic quality of life scales in chiropractic care.

A pre-post test research design was implemented in this study. The primary data collection tools that were utilized in this research included a 57-question pre-test and a 49-question post-test (See Appendices A & B). Participants were asked to complete the pre-test survey before seeing the chiropractor. Five weeks after the initial visit to the chiropractic clinic, each participant was mailed a post-test questionnaire.



## CHAPTER TWO

### INTRODUCTION

There is an extensive literature base on chiropractic in the social sciences dating back to the early 1950s. Initial writings captured chiropractic's more arcane features and were in many ways aligned with the anti-chiropractic perspective of that era's standard of organized medicine. Terms used to describe chiropractic in earlier literature include marginal, deviant, stigmatized, outcasts and scientifically invalid form of care (Cobb, 1977). The 1978 Sociological Symposium publication devoted to chiropractic marked the beginning of a new era in the social mind of chiropractic. This was when individuals recognized that the earlier conceptualizations were not based on empirical data. Writers such as Wild (1978) acknowledged that the focus on marginality was likely politically created and was no longer appropriate for the profession. Also, Nofz (1978) went so far as to introduce the idea of chiropractic as a distinct paradigm.

A second landmark in sociological writings on chiropractic occurred in 1991, when chiropractic's leading research journal, the *Journal of Manipulative Physiological Therapeutics* (JMPT), devoted an issue to the sociology of chiropractic. This work focused on the political attempts to exclude chiropractic and attempted to prevent labeling of chiropractic profession.

Between the late 1940s and the 1980s, a significant transformation occurred in the way chiropractic was perceived by scholars. Social scientists began to look at chiropractic as an alternative form of health care (Kelner, Hall & Coulter, 1980) or as a specialty within the health care system (Caplan, 1984). There has also been discussion that chiropractic could be a mechanism for entry into the health care system or even be used as a form of primary health care (Coulter, 1992; Bower & Mootz, 1995). Currently, chiropractic has widespread social

acceptance and it is now legally recognized in every state in North America (Lamm & Wegner, 1989).

The philosophy of chiropractic, which dates back almost 100 years ago, is about the self-organization/self-healing ability of the body and the importance of the nervous system in coordinating this process. Several models in chiropractic's biological explanation of healthy living have shown to be supported by modern theoretical biology (Senson, 1999). The philosophy of chiropractic has traditionally held a spiritual quality in its definition of life, which relates more to quality of life expression than a strict scientific explanation. In order to integrate this characteristic with the biological explanation, it is necessary to use concepts rooted in systems theory to discuss chiropractic care and outcomes. One way that this connection can be established is by conducting research in the field of chiropractic.

Throughout chiropractic's 100-year history, the terms "research" and "science" have been among the most popular in the literature of chiropractic and have often been used in ways that are unfamiliar to most scientists. Originally, science was constructed as a relatively static body of knowledge and was thought to reflect the will of God. Research in the chiropractic field was an ill-defined activity, and acquisition of new knowledge did not involve the experimental methodology that increasingly took hold in biology and medicine in the twentieth century (Keating, Green & Johnson, 1995). In early research history, chiropractors often viewed science and research as marketing strategies. Clinical data collection was very sporadic and was not documented for replication. In addition, results were interpreted as indisputable proof of investigator's a priori assumptions about the effectiveness of chiropractic methods (Martin, 1994). At the end of World War II, some professionals in the field recognized the need for research reform and the national association of chiropractors established a nonprofit foundation

for the purpose of raising funds for chiropractic research and education. When the efforts of this group failed, several more decades passed before a sustained research effort and interest in clinical experimentation became evident in chiropractic (Keating et al., 1995). Today, chiropractic is unique among the alternative care methods in the degree to which it has instituted research. There are two major research foundations funded by the profession, the Foundation for Chiropractic Education and Research (FCER) and the Consortium for Chiropractic Research (CCR), and several minor ones. In addition, all accredited chiropractic colleges are mandated by the accrediting agency, the Council on Chiropractic Education (CCE), to have a division of research (Mootz, Coulter, & Hansen, 1997).

Chiropractic as a profession is rightly interested in finding firmer ground on which to base its practice. Answering the questions “Does it work?” and “How does it work?” requires research. When investigating many of the research questions in the field of chiropractic it has been found that they may or may not be answered using the same methods employed in physiology or molecular biology (Mealing, 1998). To a large extent, reductionist thinking has dominated most of the natural sciences and chiropractic research. An extreme example of chiropractic reductionism is the attempt to mathematically analyze spinal problems in order to reduce chiropractic diagnosis to a single, simple Newtonian equation (Dulhunty, 1996). Few would deny that reductionism has provided many advances in the quality of the human condition. However, using reductionism as a direct application to all areas of investigation is becoming increasingly questioned. Because of this, other areas of science, such as psychology and sociology, have been found to offer more appropriate methods of conducting research in the field of chiropractic (Mealing, 1998). Many researchers have argued that psychology and sociology provide knowledge of the spectrum of methodological paradigms, which allows for

more appropriate types of investigation (e.g. qualitative or quantitative) to be matched to the appropriate scale and type of questions (Kleynhans & Cahill, 1991; Kleynhans, 1991).

Chiropractic is the third largest learned health care profession after medicine and dentistry. There are nearly 50,000 practicing chiropractors in the United States and almost 10,000 students enrolled in chiropractic colleges (Mootz et al., 1997). The proportion of the U.S. population who use chiropractors and the number of chiropractic visits per capita has almost doubled in the past 15-20 years (Shekelle, 1994; Von Kuster, 1980). A study conducted by Meeker in 1997, found that almost one third (192 million) of the 629 million visits to alternative medicine providers in 1997 were to chiropractors. The Chiropractic visit rate has been calculated at 100 visits per 100 people per year. It has also been reported that more than 30% of people with lower back injuries directly seek out chiropractic care (Carey et al., 1995). Of the alternative medical systems, chiropractic is arguably the most firmly entrenched. In the U.S. there are 17 accredited schools of chiropractic (as of July 1996). Chiropractors, as a whole, are responsible for the largest amount of billed services for manipulation covered by insurance (94%) and the estimated annual expenditures for chiropractic services were \$2.4 billion (Shekelle, 1994).

A factor that has contributed to the newfound interest in chiropractic is the fact that alternative medicine has been the focus of considerable expenditure by the public. The most compelling evidence for this recent interest in alternative care comes from a study conducted by Eisenberg et al., (1993). They found that 34 percent of phone survey respondents, one out of every three Americans, had used at least one unconventional therapy in 1990. The three most common alternative therapies were relaxation techniques, chiropractic and massage. In addition,

the number of visits for “unconventional care” was estimated to be 425 million visits, which exceeded the number of visits in 1990 for all primary care physicians (388 million).

Due to the accumulating interest in Chiropractic care, greater emphasis is being placed on research into clinical effectiveness of treatments, prevention of back pain, patient satisfaction and quality assurance in the chiropractic field (Haldeman, 1992). In 1997, there was a national, federally sponsored effort to create a prioritized research agenda for the chiropractic profession. Key research questions and issues were identified in the areas of health services research, practice environments and accountability/quality management. Six recommendations for a health services agenda for the chiropractic profession were made: determine barriers to usage of chiropractic; develop models to explain chiropractic usage, determine cost-effectiveness of different chiropractic procedures; develop valid measures and predictors of quality chiropractic care; and examine satisfaction with chiropractic services from patients, other providers, purchasers, etc. (Mootz et al., 1997).

Chronic low-back pain represents a health problem of major proportions. Various estimates indicate that from 60 to 85% of all American adults will have an episode of low-back pain at some point during their lives (Addison, 1985; Mayer & Gatchel, 1988). Nearly 7 million Americans are treated for low-back pain every day, and as many as 8 million American adults are partially or permanently disabled each year because of chronic low-back pain (Mayer & Gatchel, 1988). Low-back trouble can be considered as any one of the syndromes characterized by pain and/or disability generally assumed to result from mechanical disorders of the lumbar spine (Burton & Tillotson, 1990). These disorders have been shown to have a complex multifaceted cause, and because the underlying structural damage is often unknown, they frequently have an uncertain diagnosis (Jayson, 1970; Mooney, 1983). It has been estimated that

80% of all people experience some form of back trouble during their active life (Frymoyer, 1988). Neck problems constitute a smaller proportion of these troubles, but also pose a major health problem. A large epidemiological study in the Netherlands reported a lifetime prevalence of neck pain in 30% of the male and 43% of the female participants (Valkenburg, Laar, Hofman & Haanen, 1980 cited in Borghouts, Koes & Bouter, 1998). In most cases, no underlying pathology can be established and the causes of neck complaints remain unknown, just as with low-back problems (Koes et al., 1992). Bonica (1982) reported that the direct and indirect costs of back pain in 1980 approached 24 billion dollar; more current estimates of its costs exceed 40 billion dollars (Mayer & Gatchel, 1988). Economic pressures and poor outcomes among back patients have given rise to a wide variety of alternative treatment modalities for this difficult sector of problems. Along with the development of new treatment strategies, there has been a renewed interest in identifying characteristics and variables that may contribute to treatment success or failure (Polatin et al., 1988). Human beings dislike uncertainty, so patients and clinicians alike have a natural desire to accurately predict a disorder's course. This predictability is of particular importance in economic and scientific contexts. There are substantial potential savings from early identification of the 80% of cases that will make a full recovery from back problems (Burton & Tillotson, 1989).

The past decade has led to greater scientific exploration and discussion of the causes and treatment of spinal problems. There has been much interest in identifying variables that can predict outcomes in patients with back problems. The inability to predict outcomes seriously impedes clinical trials and leads to inappropriate or unnecessary treatment (Burton & Tillotson, 1990). Studies looking for prognostic indicators have revealed several factors individually related to clinical outcomes. The most frequently indicated predictors include such factors as

duration of current episode, previous back problems, occupation, patient expectation of treatment success, co-morbidity, gender, age, and depression (Skargren & Oberg, 1998; Burton et al., 1995; Bronfort & Bouter, 1999; Polatin et al., 1988; Leclerc et al., 1999; McIntosh et al., 2000; Burton & Tillotson, 1990; Katz et al., 1999; Radanov et al., 1994; Bendix et al., 1998). In a study conducted by Burton and Tillotson (1990), analyses were used to determine predictive models for low-back trouble outcomes at 1 month, 3 months, and 1 year. The variables selected in the analyses were 29 items from a clinical interview at presentation. Stepwise analysis at the one-month assessment point found that history of previous low-back trouble, frequency of previous low-back pain trouble, length of current spell, type of occupation, pain score, and five clinical items predicted improvement in low-back troubles. Other predictors for improvement at the 3-month and 1 year assessment points included such factors as age, previous treatment of current spell and if the patient was off from work during their current spell (Burton & Tillotson, 1990). Another study reported results from a large-scale investigation of the tertiary predictive potential of 42 psychosocial, economic, medical-physical and demographic variables obtained from back-injured workers entering a rehabilitation program (Polatin et al., 1988). Overall, it was found that patients in the success group had fewer back surgeries than those in the failure group. Psychosocial self-report data found that lower initial pain intensity was correlated with a higher degree of successful outcome. Also, the self-report of depression was discovered to be predictive of success/failure. Depression has been documented at a very high incidence in chronic low-back pain (Lindsey & Wyckoff, 1981). A study by McIntosh et al. (2000) reported that factors such as working in the construction industry, older age, intermittent pain, and previous episodes of back pain significantly predicted the amount of time workers' claimed compensation benefits for low back pain. Skargren and Oberg (1998) investigated predictive

factors for outcome of low back and neck pain in patients treated in primary care compared to treatment with a chiropractor. The multiple regression analysis revealed five significant prognostic factors: duration of current episode, Oswestry (low back disability index) score at entry, expectations of treatment, number of localizations, and well-being. No significant differences in effect or regression coefficients for the prognostic factors were seen between the two treatment strategies.

Research on neck disorders has shown similar predictive factors as that of low back problems. A one-year study on predictive factors for neck disorders looked at five components for predicting outcomes in patients with neck trouble. They found that female gender and older age were predictors for persistence of neck disorders. In addition, neck pain, psychological distress, and psychosomatic problems were predictors for incidence and persistence of neck disorders (Leclerc et al., 1999). Radanov et al. (1994) investigated the predictive relationship between a large number of psychosocial factors (e.g., self-ratings of well-being, personal and family history, personal traits, and cognitive function, etc.) and the course of recovery in patients with dislocation of the cervical vertebrae. According to the regression analysis the following set of initial variables had a significant relationship with poor recovery at 1 year: higher age, complaint of sleep disturbances at initial investigation, and higher intensity of initial neck pain. A systematic review was conducted by Borghouts et al. (1998) on the clinical course and prognostic factors of non-specific neck pain. A computerized literature search found a total of 23 eligible publications. Only seven of the 23 studies were determined to have an adequate quality of methods. A great diversity of outcome measures was used. Pain and general improvement were reported most frequently as primary outcome measures. The most frequently reported prognostic factors were age, sex, severity of pain, localization, duration, occupation and



radiological findings. But, due to the limited number of studies and the low methodological quality, there were some indications that there is no association between localization and worse outcome. This is also true for radiological findings.

Another issue that is becoming increasingly important in the evaluation of the outcome of treatment in back problems is the patients' view about their current health status (Taylor, Taylor, Foy & Fogg, 1999). This trend has given rise to a surplus of measures attempting to address patient perceptions by using disease-specific and generic health questionnaires. Reduced quality of life is considered a key symptom, correlated with many physical disturbances (Spilker, 1990). Therefore, quality of life measures are becoming a required part of health care outcome assessments to establish the comparative efficacy of different treatments or services delivery systems. The validity and reliability of these measures are often well established, but their ability to measure change in patients' function over a period of time is often lacking in documentation. According to Kirshner and Guyatt (1985), health status measures have three broad applications: discrimination between individuals and groups, evaluation of change over time, and prediction of outcomes. The SF-36 generic health questionnaire is becoming the established tool of choice for monitoring patient's health status (Taylor et al., 1999). The SF-36 has been found to be a promising instrument for measuring health perception in primary health care. It is easy to use, acceptable to patients, and fulfils stringent criteria of reliability and validity (Brazier et al., 1992). A study by Claiborne, Krause, Heilman and Leung (1999) purposed to expand the set of quality of life measures presently available to spinal disease patients. Their research investigated if the SF-36 was a valid instrument for measuring patient-reported quality of life for surgical and non-surgical spinal disease populations. The results of the study indicated that the SF-36 was an appropriate survey

to guide the practitioner in identifying and measuring quality of life issues for low back patients. On the other hand, Suarez-Almazor et al. (2000), found that most SF-36 subscales did not adequately reflect changes in the health status of patients with lower back pain, mostly for those who reported deterioration. They found that the disease-specific Oswestry Disability Index was the most consistent in discriminating among patients who improve and those who deteriorate. The researchers suggest that additional research is needed to evaluate the role of generic measures of quality of life in the assessment of patients with back problems before they can be widely implemented in clinical settings or outcomes research.

Research on general health status and disease-specific questionnaires in patients with back problems has been somewhat contradictory in the past. Although a substantial amount of normative and condition-specific profiles now exist especially for the SF-36, responsiveness in various specific patient populations requires further research (Bronfort & Bouter, 1999). This study will assist in filling the research gap in the chiropractic patient population. It will also continue to build on and aid in the clarification of the growing literature base concerning general health status and disease-specific questionnaires in patients with back problems.

There currently are a number of studies that have evaluated primary predictors and secondary predictors of outcomes in lower back and neck problems. Many of these studies have taken either a shot-gun or narrowed-and-specific approach for identifying predictive components. The shot-gun approach uses a large number (25-50) of “possible” prognostic factors that are arbitrarily entered into the predictive equation to try and explain outcomes. This approach needs to be interpreted very carefully due to the increased risk of making a Type I error. On the other hand, the narrowed-and-specific approach does not take into account a diversity of predictive factors. Many of these studies overlook possibly important components of

the prediction equation. Systematic reviews have identified several of the most consistent predictors across studies, but researchers have not integrated these factors into a single investigation. The following study, which integrates all of the most consistent predictors, will allow us to strengthen our ability to predict outcomes in patients with lower back and neck problems. This will decrease the occurrence of unnecessary treatment and will increase the prescription of more appropriate therapy.

This research is an exploratory study, which integrates all of the most consistent chiropractic outcome predictors into a single investigation in order to identify the most predictive components in chiropractic care. This study will also further clarify contradictory research findings on general health status and disease-specific questionnaires in patients with back problems.

## CHAPTER THREE

### METHODS

#### *Participants*

The participants in the study were first-time patients at two Chiropractic clinics in Midwestern Minnesota. In each case, the chief complaint included low-back pain and/or neck pain, and the examining chiropractor's diagnosis was some form of spine problem. The two chiropractors in this study utilized diversified spinal manipulation techniques along with massage therapy, electrical stimulation, and heat treatments to care for patients.

There were 87 eligible patients who gave informed consent to participate and completed the pre-test questionnaire. Fifty participants filed out their post-test questionnaires for a return rate of 57.5% in the study. There were 35 females and 14 males participants. One individual did not state their gender. The mean age of participants was 59.4 years.

#### *Measures*

A 57-item pre-test and a 49-item post-test were utilized in this study along with neck and lower back disability indexes which consisted of 10-items each (see Appendices A, B & C for questionnaires). These questionnaires included several primary and secondary outcome and predictive measures that are described in greater detail below.

#### *Primary Outcome Measures*

*General health status.* General health status was measured by the widely used Medical Outcomes Study Short Form 39-item Health Survey (SF-36), which measures eight domains and includes 3 diagnostic items. The eight domains are: physical functioning, social functioning, mental health, energy and vitality, pain, general health and role limitations due to physical and

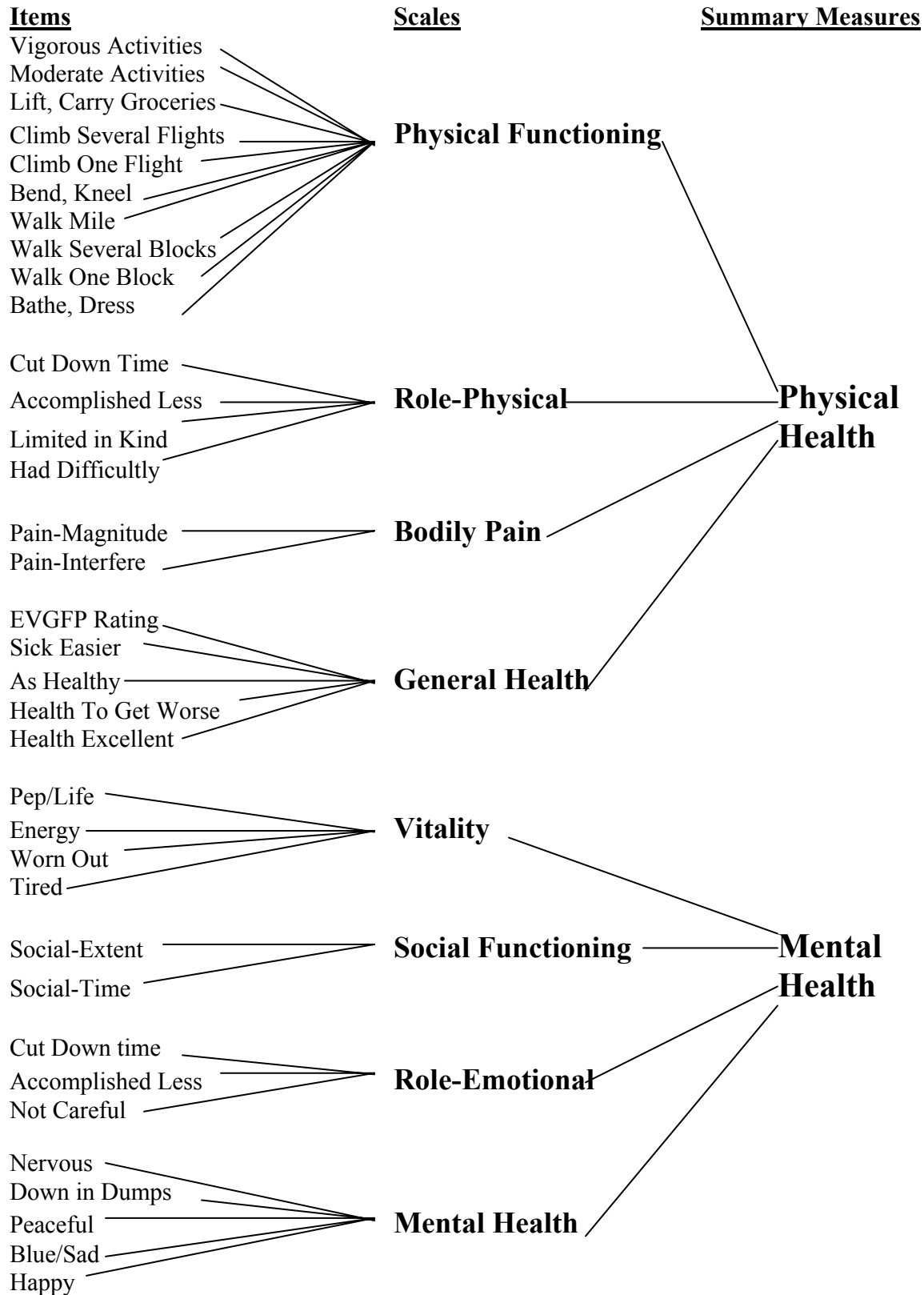
emotional problems (see Table 1) (Ware & Sherbourne, 1992). The three diagnostic items indicate depressive tendencies. Table 1 also includes the reliability scores for each domain using Cronbach's alpha.

Table 1

## Reliability &amp; Definition of SF-36 Scales

			<b>Definition</b>
<b>Scales</b>	<b>Reliability</b>	<b>Lowest Possible Score (Floor)</b>	<b>Highest Possible Score (Ceiling)</b>
<b>Physical Functioning</b>	.93	Very limited in performing all physical activities including bathing or dressing	Performs all types of physical activities including the most vigorous without limitations due to health
<b>Role-Physical</b>	.89	Problems with work or other daily activities as a result of physical health	No problems with work or other daily activities
<b>Bodily Pain</b>	.90	Very severe and extremely limiting pain	No pain or limitations due to pain
<b>General Health</b>	.81	Evaluates personal health as poor and believes it is likely to get worse	Evaluates personal health as excellent
<b>Vitality</b>	.86	Feels tired and worn out all of the time	Feels full of pep and energy all of the time
<b>Social Functioning</b>	.68	Extreme and frequent interference with normal social activities due to physical and emotional problems	Performs normal social activities without interference due to physical or emotional problems
<b>Role-Emotional</b>	.82	Problems with work or other daily activities as a result of emotional problems	No problems with work or other daily activities
<b>Mental Health</b>	.84	Feelings of nervousness and depression all of the time	Feels peaceful, happy, and calm all of the time

Figure 1  
SF-36 Measurement Model



The SF-36 was constructed to satisfy minimum psychometric standards necessary for group comparisons involving concepts that are not specific to any age, disease, or treatment group. The eight health concepts were selected, from the 40 concepts included in the Medical Outcomes Study, to represent those found to be most frequently measured in widely-used health surveys (Ware & Sherbourne, 1992). Medical Outcomes Study researchers selected and adapted questionnaire items from several health status questionnaires and developed new measures for a 149-item Functioning and Well-Being Profile (Stewart, Hays, & Ware, 1988), which was the source of the SF-36. Each of the 36 items in the SF-36 is placed into the eight health concepts as illustrated in Figure 1.

*Neck and lower back disability index.* Disability was measured by either the Neck or Lower Back Disability Index, a reliable and valid measure containing ten pain relevant items (Vernon & Mior, 1991; Fairbank, 2000) (see Appendix C). Each item is rated on a 6-point scale (0= no disability, 5= maximal disability). A total score of 50 is thus possible and would indicate 100% disability. So, for example, a score of 10 of a possible 50 would constitute a 20% disability. The participants were asked to complete either the neck or lower back disability index according to their primary problem. If they presented problems in both regions they were asked to complete both sections of the disability index. Table 2 displays the interpretation of disability score classifications.



Table 2

## Disability Score Classifications

<b>0%-20%: Minimal Disability</b>	<p>This group can cope with most living activities. Usually no treatment is indicated, apart from advice on lifting, sitting posture, physical fitness, and diet. In this group some patients have particular difficulty with sitting, and this may be important if their occupation is sedentary, e.g., a typist or truck driver</p>
<b>20%-40%: Moderate Disability</b>	<p>This group experiences more pain and problems with sitting, lifting, and standing. Travel and socializing are more difficult and they may well be off work. Personal care, recreation, and sleeping are grossly affected, and the back condition can usually be managed by conservative means.</p>
<b>40%-60%: Severe Disability</b>	<p>Pain remains the main problem in this group of patients, but travel, personal care, social life, recreation activity, and sleep are also affected. These patients require detailed investigation.</p>
<b>60%-80%: Crippled</b>	<p>Back pain impinges on all aspects of these patients' lives both at home and at work and positive intervention is required.</p>
<b>80%-100%</b>	<p>These patients are either bed-bound or exaggerating their symptoms. This can be evaluated by careful observation of the patient during medical examination.</p>

*Pain.* Patients were asked to rate their typical neck pain over the last week on an ordinal 11-box scale (Jaeschke, Singer, & Guyatt, 1995). This is a frequently used assessment of variation in pain intensity, and a reliable measure of treatment efficacy. Pain was rated by patients on a scale from 0-10 (0= no pain, 10= worst pain possible). The advantage of the 11-box scale is that it is easy to administer and score.

#### *Secondary Outcome Measures*

*Improvement (global change).* Patient-rated improvement or global change is an important patient-orientated outcome measure, which has been demonstrated to be reliable and responsive (Deyo, Walsh, Martin, Schoenfeld, & Ramamurthy, 1990). Patients were asked to use the 9-point ordinal scale to compare their back pain condition to what it was prior to treatment. Response choices were: no symptoms, much better, somewhat better, a little better, no change, a little worse, somewhat worse, much worse, twice as bad.

*Disability days.* Days in which activity is restricted due to back pain, was assessed by a self-report item. The question asked the patient to reflect back over the past 31 days and report the number of days they were unable to carry out their daily occupational work for one half day or more because of their back condition.

*Medication use.* Prescription and non-prescription medication use for back pain was measured using a item which asked the patient to rate how many days during the past week they have used any over the counter or prescription medication for back pain.

*Patient satisfaction.* Patient satisfaction was measured on a 5-point scale (1= poor, 5= excellent) using seven questions addressing different aspects of patient care. These measures were used by Cherkin, Deyo, Street, Hunt, and Barlow (1996), who found the seven items to constitute a single scale. A global question concerning overall satisfaction with care also was asked of the patients. This was measured on a 7-point scale (1= completely satisfied, 7= completely dissatisfied).

*Number of visits.* The chiropractor was asked to identify the number of visits the patient recorded from initial to follow-up measurement. This particular measure was used to examine differences in patient outcomes.

#### *Predictive Measures*

*Duration of current episode.* In order to measure duration of current episode patients were asked to identify how long ago their current condition began. This was scored on a 7-point scale (1= less than two weeks ago, 7= over two years ago).

*Previous back problems.* Previous back problems were assessed using two questions. The first one asked if the patient has had back symptoms before their current episode (1= no, 2= Yes, one episode, 3= Yes, two or more episodes). The second question asked if the patient had had previous back surgery and if so, how many.

*Occupation.* Occupational group has been found to be a predictive factor in chiropractic outcomes (Leclerc et al., 1999). These issues were identified in the study through five specific

questions. The patients were asked to describe their current employment status, identify their current occupational category (see Question 45 in appendix A), and rate their occupation as to physical demand, stress, and overall satisfaction.

*Expectation.* Patient expectation can influence outcomes. It has been found that low expectation of treatment will lead to poorer outcomes (Skargren & Oberg, 1998). To assess expectation in this study there were three questions which asked the patient to rate their expectations (1= not likely, 5= extremely likely) for complete pain relief, moderate pain relief, and return to usual activities.

*Co-morbidity.* Co-morbidity was established by asking the patient to identify which conditions they have ever experienced from a list of nine disorders. These disorders included: diabetes, heart disease, stroke, arthritis other than in their back, asthma or lung disease, depression, high blood pressure, colitis, and psoriasis.

*Gender and age.* Gender and age are demographic variables that have consistently been found to be predictors of chiropractic outcomes. Female gender and older age are two of the strongest outcome predictors for neck and low back disorder (Radanov et al., 1994; Leclerc et al., 1999; Bendix et al., 1998).

*Depression.* Level of persisting disability has also been found to depend on psychosocial measures (Burton et al., 1995; Leclerc et al., 1999). Depression was measured using three yes or no questions in the SF-36 portion of this study. These questions inquired about the absence or

presence of previous depressive or sad episodes. The depression questions were used as a screening tool for a depression classification.

*Initial measure of condition.* Pre-test scores for each outcome were used to assess initial severity of the patients' condition. It has been found that patients who remained symptomatic at follow-up had significantly higher ratings of initial neck pain (Radanov et al., 1994).

*Health care utilization.* Health care utilization was measured in two dual-part questions which provided information about the type of health care provider they visited and how many visits they made to this provider for their current condition before their initial visit to the chiropractic clinic.

### *Procedures*

A pre-post test research design was implemented in this study. The primary data collection tools that were utilized in this research included a 57-question pre-test and a 49-question post-test (see Appendices A & B). The participants read and signed the informed consent document before completing the pre-test questionnaire on their initial visit to the chiropractic clinic. Participants were asked to complete the pre-test survey before seeing the chiropractor. Five weeks after the initial visit to the chiropractic clinic, each participant was mailed a post-test questionnaire. The five-week time frame is standard length for short-term follow-up in chiropractic research as specified by a chiropractic college in Southwestern Minnesota. After they completed this survey they were asked to mail it back to the chiropractic clinic using a postage paid envelope that was included along with the questionnaire. After the

post-test was returned to the chiropractic clinic, the chiropractor then documented the participant's total number of visits to the clinic.

## CHAPTER FOUR

### RESULTS

In order to identify the predictive factors for short-term outcome in this study, a stepwise linear regression was conducted for general physical health, general mental health and pain level outcome measures using the predictive measures as independent variables. Prior to these analyses, a paired samples t-test was performed to investigate change between pre-test and post-test outcome variables. The results revealed that there was a significant difference from pre-test to post-test scores on all five primary outcomes (see Table 3).

Table 3

Paired Samples t-test for Primary Outcome Measures

Pair	Variables	Paired Differences			t	df	Sig.
		Mean	SD	SE			
1	Pain Level – Pre (M=5.20), Post (M=2.73)	-2.48	2.63	.396	-6.253	43	.000
2	Neck Disability – Pre (M=23.00), Post (M=15.58)	-7.42	11.49	2.34	-3.17	23	.004
3	Low-Back Disability – Pre (M=36.00), Post (M=22.61)	-13.38	15.87	3.11	-4.30	25	.000
4	Physical Health – Pre (M=57.62), Post (M=65.03)	7.41	17.67	2.50	2.967	49	.005
5	Mental Health – Pre (M=67.58), Post (M=72.64)	5.06	14.87	2.10	2.41	49	.020

In order to manage the number of factors in the study, previous to the regression analyses, a Pearson correlation was performed with all of the predictive measures for each primary outcome. This was done in order to determine which predictors were significantly correlated with each primary outcome and therefore should be entered into the stepwise regression.

Several predictors were significantly correlated with pain level outcome and were used as independent variables in the stepwise linear regression: co-morbidity, previous visits to other health care providers (HCPs), age, and working in a service occupation. The regression results showed that the number of other conditions they currently have (co-morbidity), working in a service occupation and previous visits to other health care providers (HCPs) were significant predictors of pain level outcome (see Table 4).

Table 4

## Model Summary and Coefficients for Pain Level Regression

Model	Variable	Unstand.	Stand.	t	Sig.	R <sup>2</sup>	F	df	Sig.
		Beta	SE	Beta		change			
1	Co-morbidity (M=1.33)	.604	.235	.368	2.568	.014	.136	6.593	42 .014
2	Services occupation (M=.22)	1.440	.712	.282	2.021	.050	.078	5.582	41 .007
3	Previous visits to other HCPs (M=1.04)	.575	.247	.314	2.325	.025	.094	5.924	40 .002

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Dependent Variable: Typical pain level



General physical and mental health status were found to have significant Pearson correlations with co-morbidity, age, expectation score, depression, and initial physical and mental health scores. The results of the regressions found that the only significant predictor for either of these outcomes were their initial health scores (pre-test scores) (see tables 5 & 6).

Table 5

## Model Summary and Coefficients for Physical Health Post-Test Regression

Model	Variable	Unstand. Beta	Stand. SE	Stand. Beta	t	Sig.	R <sup>2</sup> change	F	df	Sig.
1	Initial mean percentage of physical health, pre- test (M=57.62)	.752	.121	.693	6.235	.000	.481	38.879	42	.000

Dependent Variable: Mean percentage of physical health post-test

Table 6

## Model Summary and Coefficients for Mental Health Post-Test Regression

Model	Variable	Unstand. Beta	Stand. SE	Stand. Beta	t	Sig.	R <sup>2</sup> change	F	df	Sig.
1	Initial mean percentage of mental health, pre-test (M=67.58)	.532	.106	.636	5.012	.000	.404	25.121	37	.000

Dependent Variable: Mean percentage of mental health post-test

Due to the small number of participants in the neck and low back categories, data in these sections were analyzed using partial correlations rather than regression analyses. Analyzing the data in this manner reduced the chances of producing erroneous outcomes caused by the small amount of subjects in these particular groups. A Pearson correlation was still performed with all of the predictive measures for each primary outcome in these groups prior to conducting the partial correlations. The following predictors were significantly correlated with neck disability outcome and were entered as variables in the partial correlation: co-morbidity, initial measure of neck disability and depression. The partial correlation showed that initial neck disability was the only independent variable that was significantly correlated with neck disability outcome. (see Table 7).

Table 7

## Partial Correlations for Neck Disability

Variable	Coefficient	D.F.	Sig.	Variables Controlled
Initial neck disability	.572	16	.013	Co-morbidity, depression
Depression	.438	16	.069	Initial neck disability, co-morbidity
Co-morbidity	.366	16	.135	Depression, initial neck disability

Outcome Variable: Post-test neck disability

The following predictors were significantly correlated with low back disability outcome and were used as variables in the partial correlation: co-morbidity, previous visits to other health care providers (HCPs), initial severity of low back disability, and age. The partial correlation revealed that co-morbidity, previous visits to other health care providers (HCPs), and initial

measure of low back disability were significantly correlated with low back disability outcome (see Table 8).

Table 8

Partial Correlations for Low Back Disability

Variable	Coefficient	D.F.	Sig.	Variables Controlled
Co-morbidity	.556	21	.006	Age, initial LB dis., prev. visits
Previous provider visits	.533	21	.009	Co-morbidity, age, initial LB dis.
Initial low back disability	.489	21	.018	Prev. visits, co-morbidity, age
Age	-.052	21	.814	Initial LB dis., prev. visits, co-morb.

Outcome Variable: Post-test low back disability

To examine the secondary purpose of this study, evaluating the role of generic measures of quality of life in the assessment of chiropractic care, total disability scores were created for both neck and lower back tests. This variable was calculated by subtracting the post-test score from the pre-test score. In addition, one total percentage of possible score was created for the SF-36 so that it could be assessed as a whole. A correlation analysis was conducted for both the total neck score and total low back score using all eight of the follow-up health status questionnaire (SF-36) subscales and three summary measures as correlation variables. The results of these analyses showed that the only significant correlation with improvement or deterioration in neck and low back tests was the vitality subscale for low back, and general health perception and vitality for neck outcomes (see table 9).

Table 9

Correlations for Total Neck and Low Back Scores with Health Status

Questionnaire Scales

Variable		Neck score	Low Back score
Physical functioning	Pearson Correlation	.371	.159
	N	24	26
Role-physical	Pearson Correlation	.203	.271
	N	23	25
Social functioning	Pearson Correlation	-.118	.036
	N	24	26
General health perception	Pearson Correlation	.450*	.372
	N	24	26
Bodily pain	Pearson Correlation	.346	.339
	N	24	26
Vitality	Pearson Correlation	.492*	.586**
	N	24	26
Role mental emotional	Pearson Correlation	.217	-.196
	N	24	26
Mental health	Pearson Correlation	.361	.100
	N	24	26
Mean percentage of mental health	Pearson Correlation	.389	.192
	N	24	26
Mean percentage of physical health	Pearson Correlation	.367	.339
	N	24	26
Mean percentage-of-possible	Pearson Correlation	.394	.360
	N	24	26

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

## CHAPTER FIVE

### DISCUSSION

Several studies have investigated specific predictors in chiropractic care outcomes, but almost none of the past research has combined previously identified significant predictors to determine the most important predictive factors. Also, the literature base concerning the role of generic measures of quality of life has been very limited in the assessment of chiropractic patients. In order to bridge this gap in research, it is necessary to add to the understanding about generic quality of life scales in chiropractic care.

Past significant predictors of chiropractic outcomes include such factors as duration of current episode, previous back problems, occupation, expectation, co-morbidity, gender, age, and depression (Skargren & Oberg, 1998; Burton et al., 1995; Bronfort & Bouter, 1999; Polatin et al., 1988; Leclerc et al., 1999; McIntosh et al., 2000; Burton & Tillotson, 1990; Katz et al., 1999; Radanov et al., 1994; Bendix et al., 1998). The effects of these factors were measured primarily on outcomes such as general health status, neck and lower back disability, and pain. One aim of this study was to identify, from previously identified significant predictors, the most important prognostic factors predicting disability and improvement at short-term follow-up.

The results of this research showed that there was a significant difference between pre-test and post-test scores on all five of the primary outcome variables. This gives us the understanding that a positive change did occur in the time frame from the patients' initial visit to their 5-week follow-up at the chiropractic clinic.

The study also revealed that several factors predict outcomes for short-term pain level. Co-morbidity predicted 13.6% of variance in pain level at follow-up. As the study shows, the greater number of conditions a patient has along with back trouble has an important effect on the

amount of pain they have after treatment. This is in agreement with research conducted by Katz et al. (1999), which found that low cardiovascular co-morbidity was a predictor of favorable outcomes. The results also show that another predictor for pain level outcomes is previous visits to other health care providers. This factor reveals that the more attempts a patient has made to correct the back problem with visits to other health care providers, the greater the patients disability will be at short-term follow-up. Moreover, post-regression analyses revealed significant interactions between the three pain level predictors. This only strengthens the argument that chiropractors need to pay close attention to several components when admitting new patients. Understanding a patient's medical and previous treatment history will allow chiropractors to apply appropriate therapy for their patients and ensure a more successful treatment outcome. Chiropractors need to question patients' about their previous visits to health care providers and discuss which methods of treatment have been most beneficial for their back problems. If there has been no beneficial treatment provided in the past, the chiropractor could then suggest more appropriate alternative treatment modalities that other practitioners have not previously prescribed.

A study conducted by Radanow et al. (1994) found that patients' who remained symptomatic at 1 year had significantly higher ratings of initial neck pain and headache. This was also found to be true in this short-term study. Initial mean percentage of physical and mental health scores were the best predictors of post-test scores on their respective components. This is not a surprising finding. You would expect to observe that patients with higher initial scores would have corresponding follow-up results.

The results for low back and neck disability outcomes reveal similar factors and patterns in predictive ability. The outcomes for low back disability establish that co-morbidity was a

strongly correlated predictor along with previous visits to other health care providers and initial measure of low back disability. The results for neck disability showed that initial measure of disability was the only significant predictor that correlated with neck disability outcome. As previously discussed, co-morbidity and initial measure of disability play important roles in outcome measures in the chiropractic field. This continues to hold true in regards to low back and neck disability outcomes.

Contrary to previous research (Skargren & Oberg, 1998; Burton et al., 1995; Polatin et al., 1988; Leclerc et al., 1999), factors such as age, previous back surgeries, duration of current episode, and gender were not found to be significant predictors of primary short-term chiropractic outcomes. This could be due to the fact that this study used only previously identified significant predictors to isolate the most important prognostic factors and weed out the nonessential predictors from former shotgun approach studies. Conversely, even though these factors were not found to be significant predictors of the primary outcomes in this study, they were revealed to be important in some of the secondary outcomes. Prescription and non-prescription medication use was predicted by the following factors: initial medication use, previous back surgeries, working in a service occupation, and age. In addition, results showed that patient-rated global change was predicted primarily by how long the patient has had their current condition. These specific predictors and secondary outcomes may be important areas to investigate in future research.

Another issue that is becoming increasingly important in the evaluation of the outcome of treatment in back problems is the patients' view about their current health status (Taylor et al., 1999). This trend has given rise to measures attempting to address patient perceptions by using disease-specific and generic health questionnaires. Reduced quality of life

is considered a key symptom, correlated with many physical disturbances (Spilker, 1990). A study by Claiborne et al., (1999) purposed to expand the set of quality of life measures presently available to spinal disease patients. Their research investigated whether or not the SF-36 was a valid instrument for measuring patient-reported quality of life for spinal disease populations. The results of the study indicated that it was an appropriate survey to guide the practitioner in identifying and measuring quality of life issues for low back patients. On the other hand, Suarez-Almazor et al., (2000), found that most SF-36 subscales did not adequately reflect changes in the health status of patients with lower back pain.

In agreement with Suarez-Almazor et al., (2000), this study found that a majority of the SF-36 subscales and summary measures did not correlate with improvement or deterioration in chiropractic patients. In fact, the only scales that were significantly correlated with outcomes were the general health perception and vitality subscales. These results reveal that the SF-36 is not adequate to predict disease specific change in patients' function over time.

The outcomes of this research could be very beneficial to the field of chiropractic care. This study will allow chiropractors to strengthen their ability to predict outcomes in patients with lower back and neck problems. This will, in turn, decrease the occurrence of unnecessary treatment and will increase the prescription of more appropriate therapy. One important finding in this study was that co-morbidity was the most significant predictor for low back disability and pain level outcomes. This result reveals that chiropractors need to pay close attention to medical history because this will allow them to apply more appropriate treatment for their patients. It is possible that chiropractors could improve their patients' outcomes if they begin to treat non-chiropractic disease and disorders either before, or concurrently with their regular chiropractic treatment.



The effects of this study could reach beyond the chiropractic field into a broad range of medical disciplines. Many of the significant predictors found in this study are applicable in the traditional medical field and could contribute to more efficient patient care. Practitioners from all domains would benefit from additional training in patient-provider communication so that they could adequately assess both physical and psychological components of their patients' conditions. This would allow them to provide better patient care and ensure improved treatment outcomes.

Unfortunately there were some limitations to this research. The main problem with this study was that the sample size was not as robust as needed for the number of variables measured. Therefore, partial correlations were used in place of regression analyses where the number of subjects was inadequate. Patient participation was thought to be low due to the length of the study questionnaire and the use of mailing for the follow-up portion of the study. Future research should consider utilizing a condensed version of the health status questionnaire and different means of gathering follow-up data.

## References

- Addison, R. (1985). Chronic low back pain (CLO-BAP). Journal of Clinical Pain, 1, 50-59.
- Bendix, A.F., Bendix, T., & Hastrup, C. (1998). Can it be predicted which patients with chronic low back pain should be offered tertiary rehabilitation in a functional restoration program? Spine, 23(16), 1775-1783.
- Bonica, J. (1982). The nature of the problem. Management of Low Back Pain. (Eds.) Carron, H., McLaughlin. (pgs 1-15). Boston: John Wright Publishing.
- Borghouts, J.A.J., Koes, B.W., & Bouter, L.M. (1998). The clinical course and prognostic factors of non-specific neck pain: a systematic review. Pain, 77, 1-13.
- Bowers, I., & Mootz, R.D. (1995). The nature of primary care: the chiropractor's role. Topics in Clinical Chiropractic, 2, 66-88.
- Brazier, J.E., Harper, R., Jones, N.M.B., O'Cathain, A., Thomas, K.J., Usherwood, T., & Westlake, L. (1992). Validating the SF-36 health survey questionnaire: new outcome measure for primary care. British Medical Journal, 305, 160-164.
- Bronfort, G., & Bouter, L.M. (1999). Responsiveness of general health status in chronic low back pain: a comparison of the COOP Charts and the SF-36. Pain, 83, 201-209.
- Burton, A.K., & Tillotson, K.M. (1989). Prediction of the clinical course of low-back trouble using mutivariable models. Spine, 16(1), 7-14.
- Burton, A.K., Tillotson, K.M., Main, C.J., & Hollis, S. (1995). Psychosocial predictors of outcome in acute and subchronic low back trouble. Spine, 20(6), 722-728.
- Caplan, R.L. (1984). Chiropractic. In: Alternative Medicines: Popular and Policy Perspectives. (Ed.) Salmon, J. New York: Tavistock.

- Carey, T.S., Garrett, J., Jackman, A., McLaughlin, C., Fryer, J., & Smucker, D.R. (1995). The outcomes and costs of care for acute low back pain among patients seen by primary care practitioners, chiropractors, and orthopedic surgeons. The North Carolina Back Pain Project. New England Journal of Medicine, 333, 913-917.
- Cherkin, D.C., Deyo, R.A., Street, J.H., Hunt, M., & Barlow, W. (1996). Pitfalls of patient education. Limited success of a program for back pain in primary care. Spine, 21, 345-355.
- Claiborne, N., Krause, T.M., Heilman, A.E., & Leung, P. (1999). Measuring quality of life in back patients: comparison of health status questionnaire 2.0 and quality of life inventory. Social Work in Health Care, 28(3), 77-94.
- Cobb, A.K. (1977). Pluralistic legitimization of an alternative therapy system: the case of chiropractic. Medical Anthropology, 1, 1-23.
- Coulter, I.D. (1992). Is Chiropractic primary care? JCCA, 36, 96-101.
- Deyo, R.A., & Diehl, A.K. (1986). Patient satisfaction with medical care for low-back pain. Spine, 11, 28-30.
- Deyo, R.A., Walsh, N.E., Martin, D.C., Schoenfeld, L.S., & Ramamurthy, S. (1990). A controlled trial of transcutaneous electrical nerve stimulation (TENS) and exercise for chronic low back pain. New England Journal of Medicine, 322, 1627-1634.
- Dulhunty, J.A. (1996). A mathematical basis for defining vertebral subluxations and their correction. Chiropractic Journal of Australia, 26, 130-138.
- Eisenberg, D.M., Kessler, R.C., Foster, C., Norlock, F.E., Calkins, D.R., & Delbanco, T.L. (1993). Unconventional medicine in the United States. New England Journal of Medicine, 328, 246-252.

- Fairbanks, J. (2000). Revised Oswestry disability questionnaire. Spine, 25(19), 2549-2553.
- Frymoyer, J.W. (1988). Back pain and sciatica. New England Journal of Medicine, 318, 291-300.
- Haldeman, S. (1992). The evolution and importance of spinal and chiropractic research. Journal of manipulative Physiological Therapeutics, 15(1), 31-35.
- Jaeschke, R., Singer, J., & Guyatt, G.H. (1995). A comparison of seven-point and visual analogue scales. Data from a randomized trial. Controlled Clinical Trials, 11, 43-51.
- Jayson, M.I.V. (1970). The problems of backache. Practitioner, 205, 615-621.
- Katz, J.N., Stucki, G., Lipson, S.J., Fossel, A.H., Grobler, L.J., & Weinstein, J.N. (1999). Predictors of surgical outcome in degenerative lumbar spinal stenosis. Spine, 24(21), 2229-2233.
- Keating, J.C., Green, B.N., & Johnson, C.D. (1995). “Research” and “Science” in the first half of the chiropractic century. Journal of Manipulative and Physiological Therapeutics, 18(6), 357-378.
- Kelner, M., Hall, O., & Coulter, I. (1980). Chiropractors: do they help? Toronto: Fitzhenry & Whiteside.
- Kirshner, B., & Guyatt, G. (1985). A methodological framework for assessing health indices. Journal of Chronic Disease, 38, 27-36.
- Kleynhans, A.M., & Cahill, D.N. (1991) Paradigms for chiropractic research. Chiropractic Journal of Australia, 21, 102-107.
- Kleynhans, A.M. (1991). Developing philosophy in chiropractic. Chiropractic Journal of Australia, 21, 161-167.

- Koes, B.W., Bouter, L.M., Mameren, H.V., Essers, A.H.M., Verstegen, G., Hofhuisen, D.M., Houben, J.P., & Knipschild, P.G. (1992). A blinded randomized clinical trial of manual therapy and physiotherapy for chronic back and neck complaints: physical outcome measures. Journal of Manipulative and Physiological Therapeutics, 15(1), 16-23.
- Lamm, L.C., & Wegner, E. (1989). Chiropractic scope of practice: what the law allows. American Journal of Chiropractic Medicine, 2, 155-159.
- Leclerc, A., Niedhammer, I., Landre, M.F., Ozguler, A., Eto, P., & Pietri-Taleb, F. (1999). One year predictive factors for various aspects of neck disorders. Spine, 24(14), 1455-1462.
- Lindsay, P., & Wyckoff, M. (1981). The depression-pain syndrome and its response to antidepressants. Psychosomatics, 22, 571-577.
- Martin, S.C. (1994). "The only truly scientific method of healing"; chiropractic and American science, 1895-1990. Isis, 85(2), 207-227.
- Mayer, T., & Gatchel, R. (1988). Functional Restoration for Spinal Disorders: The Sports Medicine Approach. Philadelphia: Lea & Febiger.
- McIntosh, G., Frank, J., Hogg-Johnson, S., Bonbardier, C., & Hall, H. (2000). Prognostic factors for time receiving workers' compensation benefits in a cohort of patients with low back pain. Spine, 25(2), 147-157.
- Mealing, D. (1998). Quantitative, Qualitative and emergent approaches to chiropractic research: A philosophical background. Journal of Manipulative and Physiological Therapeutics, 21(3), 205-211.
- Mooney, V. (1983). The syndromes of low back disease. Orthopedic Clinicians of North America, 14, 505-515.

- Mootz, R.D., Coulter, I.D., & Hansen, D.T. (1997). Health services research related to chiropractic: review and recommendations for research prioritization by the chiropractic profession. Journal of Manipulative and Physiological Therapeutics, 20(3), 201-217.
- Nofz, M. (1978). Paradigm identification on organizational structure: an overview of the chiropractic health profession. Sociological Symposium, 22, 18-32.
- Polatin, P.B., Gatchel, R.J., Barnes, D., Mayer, H., Arens, C., & Mayer, T.G. (1988). A psychosociomedical prediction model of response to treatment by chronically disabled workers with low-back pain. Spine, 9(14), 956-961.
- Radanov, P., Sturzenegger, M., & Di Stefano, G. (1994). Prediction of recovery from dislocation of the cervical vertebrae (whiplash injury of the cervical vertebrae) with initial assessment of psychosocial variables. Orthopade, 23(4), 282-286.
- Senson, S.A. (1999). Causation related to self-organization and health related quality of life expression based on the vertebral subluxation model, the philosophy of chiropractic, and the new biology. Journal of Vertebral Subluxation Research, 3(3), 104-112.
- Shekelle, P.G. (1994). The Use and Costs of Chiropractic Care in the Health Insurance Experiment. Santa Monica, CA: RAND.
- Skargren, E.I., & Oberg, B.E. (1998). Predictive factors for 1-year outcome of low-back and neck pain in patients treated in primary care: comparison between the treatment strategies chiropractic and physiotherapy. Pain, 77(2), 201-207.
- Spilker, B. (1990). Introduction. In B. Spilker (Ed.) Quality of Life Assessments in Clinical Trials. New York: Raven Press.
- Stewart, A.L., Hays, R.D., & Ware, J.E. (1988). The MOS short-form general health survey: Reliability and validity in a patient population. Medical Care, 26, 724-732.

- Suarez-Almazor, M.E., Kendall, C., Johnson, J.A., Skeith, K., & Vincent, D. (2000). Use of health status measures in patients with low back pain in clinical settings. Comparison of specific, generic and preference-based instruments. Rheumatology, 39(7), 783-790.
- Taylor, S. J., Taylor, A. E., Foy, M.A., & Fogg, A.J.B. (1999). Responsiveness of common outcome measures of patients with low back pain. Spine, 24(17), 1805-1812.
- Thomas, M.R., & Lyttle, D. (1980). Patient expectations about success of treatment and reported relief from low back pain. Journal of Psychosomatic Research, 24(6), 297-301.
- Vernon, H., & Mior, S. (1991). The Neck Disability Index: a study of reliability and validity. Journal of Manipulative Physiological Therapeutics, 14, 409-415.
- Ware, J.J., & Sherbourne, C.D. (1992). The MOS 36-item short-form health survey (SF-36). Medical Care 30, 473-483.
- Von Kuster, T. (1980). Chiropractic health care: a national study of cost of education, service, utilization, number of practicing doctors of chiropractic and other key policy issues. Washington, D.C.: Foundation for the Advancement of Chiropractic Tenets and Science.
- Wild, P.B. (1978). Social origins and ideology of chiropractors: an empirical study of the socialization of the chiropractic student. Sociological Symposium, 22, 33-54.

## Appendix A

*Pre-test Questionnaire*

ID # \_\_\_\_\_ File #: \_\_\_\_\_ Date: \_\_\_\_\_

Dear Patient,

We would greatly appreciate your completion of the attached questionnaire. The results of this questionnaire will be used to improve chiropractic outcomes at this clinic and others. In about five weeks, we will be sending you a similar follow-up questionnaire through the mail. Thank you, in advance, for completing the questionnaire.

**Instructions:**

This survey asks for your views about your health. Answer every question by circling the appropriate number, 1, 2, 3... If you are unsure about how to answer a question, please give the best answer you can and make a comment, in the left margin.

1. In general, would you say your health is: (circle one number)
  - Excellent ..... 1
  - Very Good..... 2
  - Good..... 3
  - Fair..... 4
  - Poor..... 5
  
2. **Compared to one year ago**, how would you rate your health in general **now**? (circle one number)
  - Much better now than one year ago..... 1
  - Somewhat better now than one year ago..... 2
  - About the same..... 3
  - Somewhat worse now than one year ago..... 4
  - Much worse now than one year ago..... 5

The following items 3-12 are about activities you might do during a typical day. Does **your health now** limit you in these activities? If so, how much? (Circle one number on each line.)

	Yes, Limited a Lot	Yes, Limited a Little	No, Not Limited at All
3. <u>Vigorous activities</u> , such as running, lifting heavy objects, participating in strenuous sports	1	2	3
4. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3



	<u>Yes, Limited a Lot</u>	Yes, Limited a Little	No, Not Limited at All
5. Lifting or carrying groceries	1	2	3
6. Climbing <u>several</u> flights of stairs	1	2	3
7. Climbing <u>one</u> flight of stairs	1	2	3
8. Bending, kneeling, or stooping	1	2	3
9. Walking <u>more than a mile</u>	1	2	3
10. Walking <u>several blocks</u>	1	2	3
11. Walking <u>one block</u>	1	2	3
12. Bathing and dressing yourself	1	2	3

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health?** (Circle one number on each line.)

	YES	NO
13. Cut down on the amount of time you spent on work or other activities	1	2
14. <u>Accomplished less</u> than you would like	1	2
15. Were limited in the <u>kind</u> of work or other activities	1	2
16. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

During the **past 4 weeks**, have you had any of the following problems with your work or other regular activities **as a result of any emotional problems** (such as feeling depressed or anxious)? (Circle one number on each line.)

	YES	NO
17. Cut down on the amount of time you spent on work or other activities	1	2
18. <u>Accomplished less</u> than you would like	1	2
19. Didn't do work or other activities as <u>carefully</u> as usual	1	2

20. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups? (Circle one number)
- |                  |   |
|------------------|---|
| Not at all.....  | 1 |
| Slightly.....    | 2 |
| Moderately.....  | 3 |
| Quite a bit..... | 4 |
| Extremely.....   | 5 |
21. How much bodily pain have you had during the **past 4 weeks**? (Circle one number)
- |                  |   |
|------------------|---|
| None.....        | 1 |
| Very Mild.....   | 2 |
| Mild.....        | 3 |
| Moderate.....    | 4 |
| Severe.....      | 5 |
| Very severe..... | 6 |
22. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including work both outside the home and housework)? (Circle one number)
- |                   |   |
|-------------------|---|
| Not at all.....   | 1 |
| A little bit..... | 2 |
| Moderately.....   | 3 |
| Quite a bit.....  | 4 |
| Extremely.....    | 5 |

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the **past 4 weeks** ... (Circle one number on each line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the time
23. Did you feel full of pep?	1	2	3	4	5	6
24. Have you been a very nervous person?	1	2	3	4	5	6
25. Have you felt so down in the dumps nothing could cheer you up?	1	2	3	4	5	6
26. Have you felt calm and peaceful?	1	2	3	4	5	6
27. Did you have a lot of energy?	1	2	3	4	5	6
28. Have you felt downhearted and blue?	1	2	3	4	5	6
29. Did you feel worn out?	1	2	3	4	5	6
30. Have you been a happy person?	1	2	3	4	5	6
31. Did you feel tired?	1	2	3	4	5	6

32. During the **past 4 weeks**, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives)? (Circle one number)

All of the time..... 1  
 Most of the time..... 2  
 Some of the time..... 3  
 A little of the time..... 4  
 None of the time..... 5

How **TRUE** or **FALSE** is each of the following statements for you ? (Circle one number on each line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
33. I seem to get sick a little easier than other people.	1	2	3	4	5
34. I am as healthy as anybody I know.	1	2	3	4	5
35. I expect my health to get worse.	1	2	3	4	5
36. My health is excellent.	1	2	3	4	5

Please answer **YES** or **NO** for each question by circling “1” or “2” on each line.

	YES	NO
37. In the past year, have you had 2 weeks or more during which you felt sad, blue or depressed; or when you lost all interest or pleasure in things that you usually cared about or enjoyed?	1	2
38. Have you had 2 years or more in your life when you felt depressed or sad most days, even if you felt okay sometimes?	1	2
39. Have you felt depressed or sad much of the time in the past year?	1	2

For questions 40-57 Please answer each item by circling the appropriate answer or checking the appropriate box. (**Note:** In the following questions, when the phrase “**current condition**” is used it should be regarded as the problem or reason for your visit to this clinic.)

40. How long ago did your **current condition** (reason for this visit) begin?

(Circle one answer)

- Less than two weeks ago..... 1
- Two weeks to less than one month ago.....2
- One month to less than three months ago..... 3
- Three months to less than one year ago..... 4
- One year to less than two years ago.....5
- Over two years ago.....6

41. Have you had any back symptoms **before** your current episode?

- No.....1
- Yes, one episode.....2
- Yes, two or more episodes.....3

42. Have you had previous back surgery?

No.....1

Yes.....2

If yes, how many surgeries? \_\_\_\_\_

43. Have you previously made any visits to other health care providers for you **current condition** before seeking treatment at this clinic?

NO..... 0 → **Skip to question 44**

YES..... 1 → **Go to question 43b**

(43b) If yes, please indicate which of the following providers you visited. (Check all that apply)

- ☐ Primary Medical doctor
- ☐ Medical specialist (neurologist, orthopedic surgeon, etc.)
- ☐ Osteopath
- ☐ Chiropractor
- ☐ Massage therapist
- ☐ Physical therapist
- ☐ Other specify\_\_\_\_\_

44. How often have you taken pain relieving medication (including prescription and over the counter medications) for your current back condition **during the past week**?

0..... Have not taken any

I took pain relieving medication \_\_\_\_\_ day(s) this past week. (Write the number of days in the blank)

45. Which statements describe your current employment situation?

(CIRCLE ALL THAT APPLY)

- 1..... Currently working
- 2..... On paid leave
- 3..... On unpaid leave
- 4..... Unemployed
- 5..... Homemaker
- 6..... Student
- 7..... Retired (Not due to health)
- 8..... Disabled and/or retired because of my back problems
- 9..... Disabled due to a health problem not related to my back
- 10..... Other, specify\_\_\_\_\_

46. What is your primary occupation? If you are not working now, what was your primary occupation?

(Please circle one)

- 1..... Professional, Technical, and Managerial (e.g. engineering, computers, or managers of all types)
- 2..... Clerical (e.g. secretary, mailroom, or bookkeeper)
- 3..... Sales (e.g. sales of services and commodities)
- 4..... Services (e.g. cooks, hotel/motel, or police)
- 5..... Agricultural, Fishery, and Forestry (e.g. farming, ranching, or trapping)
- 6..... Processing (e.g. food processing, chemicals, or plastic)
- 7..... Machine trades (e.g. mechanics, printing, or mechanical repair)
- 8..... Benchwork (e.g. metal fabrication, assembly, or textile and leather)
- 9..... Structural and Construction (e.g. carpenter, plumber, or cement and plaster work)
- 10..... Transportation and Miscellaneous (e.g. trucking, utilities, or communications)

Please answer each of the following questions 47-49 about your primary job (or the one you plan to go back to if on leave). (CIRCLE ONE ANSWER FOR EACH OF THE QUESTIONS)

	Extremely	Very much	Quite a bit	Somewhat	A little	Not at all
47. Is your current work physically demanding?	1	2	3	4	5	6
48. Is your work stressful to you?	1	2	3	4	5	6
49. How much do you like your job?	1	2	3	4	5	6

50. During the past month, how many days have you been unable to carry out your occupational duties for ONE HALF DAY OR MORE because of your **current condition**. (For example, not going to work or not being able to complete job duties while at work)

(Please choose one number between 0 and 31) days

51. What was the typical level of pain due to your **current condition** during the past week?  
(Circle only one number)

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

No Pain

Worst  
Possible  
Pain

What expectations do you have for your treatment at this office?  
(CIRCLE ONLY ONE ANSWER FOR EACH QUESTION)

As a result of my treatment, I expect.....	Not likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
52. Complete pain relief	1	2	3	4	5
53. Moderate pain relief	1	2	3	4	5
54. To be able to go back to the usual activities I did before my current episode of back trouble.	1	2	3	4	5

55. Have you ever had any of the following conditions? (CIRCLE ALL THAT APPLY)

- 1..... Diabetes
- 2..... Heart Disease
- 3..... Stroke
- 4..... Arthritis other than in your back
- 5..... Asthma or other lung disease
- 6..... Depression
- 7..... High Blood Pressure (Hypertension)
- 8..... Colitis
- 9..... Psoriasis
- 10..... None of the above
- 11..... Other \_\_\_\_\_

56. What is your gender? (circle one number)

- Male.....0  
Female..... 1

57. What is your age? (Please enter your age in years on the line below)

\_\_\_\_\_

**\*\*\* For the last two pages of the questionnaire, please ONLY complete the section that refers to your current condition.**

- ☐ If your current condition deals with NECK PAIN please complete SECTION A.
- ☐ If your current condition deals with LOWER BACK PAIN please complete SECTION B.
- ☐ If your current condition deals with BOTH NECK PAIN AND LOWER BACK PAIN, or you are unsure as to which to choose, please complete BOTH SECTIONS A and B.

## Appendix B

*Post-test Questionnaire*

ID #: \_\_\_\_\_ File # \_\_\_\_\_ Date: \_\_\_\_\_

Dear Patient,

This questionnaire is a five-week follow-up to the survey that you completed on your initial visit to the Chiropractic clinic. We would greatly appreciate your completion of the attached questionnaire. The information in this questionnaire will allow us to improve patient services at our clinic. After completing both the front and back of the survey we would ask that you return it to us with the postage paid envelope that is enclosed along with the questionnaire. Thank you, in advance, for completing the questionnaire.

**Instructions:**

This survey asks for your views about your health. Answer every question by circling the appropriate number, 1, 2, 3... If you are unsure about how to answer a question, please give the best answer you can and make a comment, in the left margin.

1. In general, would you say your health is: (circle one number)
 

Excellent .....	1
Very Good.....	2
Good.....	3
Fair.....	4
Poor.....	5
  
2. **Compared to one year ago**, how would you rate your health in general **now**? (circle one number)
 

Much better now than one year ago.....	1
Somewhat better now than one year ago.....	2
About the same.....	3
Somewhat worse now than one year ago.....	4
Much worse now than one year ago.....	5



The following items 3-12 are about activities you might do during a typical day. Does **your health now** limit you in these activities? If so, how much? (Circle one number on each line.)

	Yes, Limited a Lot	Yes, Limited a Little	No, Not Limited at All
3. <u>Vigorous activities</u> , such as running, lifting heavy objects, participating in strenuous sports	1	2	3
4. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
5. Lifting or carrying groceries	1	2	3
6. Climbing <u>several</u> flights of stairs	1	2	3
7. Climbing <u>one</u> flight of stairs	1	2	3
8. Bending, kneeling, or stooping	1	2	3
9. Walking <u>more than a mile</u>	1	2	3
10. Walking <u>several blocks</u>	1	2	3
11. Walking <u>one block</u>	1	2	3
12. Bathing and dressing yourself	1	2	3

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**? (Circle one number on each line.)

	YES	NO
13. Cut down on the amount of time you spent on work or other activities	1	2
14. <u>Accomplished less</u> than you would like	1	2
15. Were limited in the <u>kind</u> of work or other activities	1	2
16. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

During the **past 4 weeks**, have you had any of the following problems with your work or other regular activities **as a result of any emotional problems** (such as feeling depressed or anxious)? (Circle one number on each line.)

	YES	NO
17. Cut down on the amount of time you spent on work or other activities	1	2
18. <u>Accomplished less</u> than you would like	1	2
19. Didn't do work or other activities as <u>carefully</u> as usual	1	2

20. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups? (Circle one number)

- Not at all..... 1  
 Slightly..... 2  
 Moderately..... 3  
 Quite a bit..... 4  
 Extremely..... 5

21. How much bodily pain have you had during the **past 4 weeks**? (Circle one number)

- None..... 1  
 Very Mild..... 2  
 Mild..... 3  
 Moderate..... 4  
 Severe..... 5  
 Very severe..... 6

22. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including work both outside the home and housework)? (Circle one number)

- Not at all..... 1  
 A little bit..... 2  
 Moderately..... 3  
 Quite a bit..... 4  
 Extremely..... 5

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the **past 4 weeks** ... (Circle one number on each line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the time
23. Did you feel full of pep?	1	2	3	4	5	6
24. Have you been a very nervous person?	1	2	3	4	5	6
25. Have you felt so down in the dumps nothing could cheer you up?	1	2	3	4	5	6
26. Have you felt calm and peaceful?	1	2	3	4	5	6
27. Did you have a lot of energy?	1	2	3	4	5	6
28. Have you felt downhearted and blue?	1	2	3	4	5	6
29. Did you feel worn out?	1	2	3	4	5	6
30. Have you been a happy person?	1	2	3	4	5	6
31. Did you feel tired?	1	2	3	4	5	6

32. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems interfered with your social activities** (like visiting with friends, relatives)?

(Circle one number)

- All of the time..... 1  
 Most of the time..... 2  
 Some of the time..... 3  
 A little of the time..... 4  
 None of the time..... 5

How **TRUE** or **FALSE** is each of the following statements for you? (Circle one number on each line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
33. I seem to get sick a little easier than other people.	1	2	3	4	5
34. I am as healthy as anybody I know.	1	2	3	4	5
35. I expect my health to get worse.	1	2	3	4	5
36. My health is excellent.	1	2	3	4	5

For questions 37-49 Please answer each item by circling the appropriate answer or checking the appropriate box. (**Note:** In the following questions, when the word “condition” is used, it should be regarded as the problem or reason for your initial visit to this Chiropractic clinic. )

37. Overall, how much has your **condition** changed since you started treatment at this clinic?  
(Circle **ONLY ONE** number)

- 1.....No symptoms (100% improvement)
- 2.....Much better (75% improvement)
- 3.....Somewhat better (50% improvement)
- 4.....A little better (25% improvement)
- 5.....No change (0% improvement)
- 6.....A little worse (25% worse)
- 7.....Somewhat worse (50% worse)
- 8.....Much worse (75% worse)
- 9.....Twice as bad (100% worse)

38. During the past month, how many days have you been unable to carry out your occupational duties for ONE HALF DAY OR MORE because of your **current condition**. (For example, not going to work or not being able to complete job duties while at work)

(Please choose one number between 0 and 31) \_\_\_\_\_ days

39. What was the typical level of pain due to your **condition** during the past week?  
(Circle only one number)

0	1	2	3	4	5	6	7	8	9	10
No Pain										Worst Possible Pain

40. Have you made any visits to other health providers for your condition since your first visit to our Chiropractic clinic? (circle only one number)

0.....NO → **SKIP TO QUESTION # 41**

1.....YES → **GO to Question #40 b**

40b. If yes, please indicate which of the following providers you visited?

**(Please check YES or NO to each provider type and provide the accompanying information.)**

- ☐ NO ☐ YES    1. PRIMARY MEDICAL DOCTOR  
Number of visits \_\_\_\_\_
- ☐ NO ☐ YES    2. MEDICAL SPECIALIST (NEUROLOGIST, ORTHOPEDIC SURGEON, ETC)  
Number of visits \_\_\_\_\_
- ☐ NO ☐ YES    3. OSTEOPATH  
Number of visits \_\_\_\_\_
- ☐ NO ☐ YES    4. CHIROPRACTOR (Other than this clinic)  
Number of visits \_\_\_\_\_
- ☐ NO ☐ YES    5. MASSAGE THERAPIST  
Number of visits \_\_\_\_\_
- ☐ NO ☐ YES    6. PHYSICAL THERAPIST  
Number of visits \_\_\_\_\_
- ☐ NO ☐ YES    7. OTHER Specify \_\_\_\_\_  
Number of visits \_\_\_\_\_

Please rate the following aspects of the care you have received at this clinic:

(Circle one number for each section)

	Poor	Fair	Good	Very Good	Excellent
41. The information you received regarding the <b><u>cause</u></b> of your condition.	1	2	3	4	5
42. The information you received regarding the <b><u>prognosis</u></b> of your condition.	1	2	3	4	5
43. The information you received regarding <b><u>activities</u></b> that would hasten your recovery.	1	2	3	4	5
44. The information you received concerning <b><u>prevention</u></b> of future pain from your condition.	1	2	3	4	5
45. The <b><u>concern</u></b> shown by your chiropractor or therapist.	1	2	3	4	5
46. The <b><u>quality</u></b> of the treatment recommendations.	1	2	3	4	5
47. The <b><u>overall care</u></b> you received for your condition.	1	2	3	4	5

48. All things considered, how satisfied are you with the care you received (or are receiving) at this clinic? (Circle **only one** number)

1.....Completely satisfied, couldn't be better  
2.....Very satisfied  
3.....Somewhat satisfied  
4.....Neither satisfied nor dissatisfied  
5.....Somewhat dissatisfied  
6.....Very dissatisfied  
7.....Completely dissatisfied, couldn't be worse

49. How often have you taken pain relieving medication (including prescription and over the counter medications) for your current back condition **during the past week**?  
0..... Have not taken any

I took pain relieving medication \_\_\_\_\_ day(s) this past week. (Write the number of days in the blank)

**Please mail this questionnaire back to the  
Chiropractic clinic with the postage paid  
envelope included along with this survey.  
Thank you for your time!**

## Appendix C

### *Neck Disability Questionnaire*

*Section A – Neck Pain.* These questions have been designed to enable us to understand how much your current condition has affected your ability to manage your everyday activities. Mark in each section only the one number which applies to you. We realize that you may feel that more than one statement relates to you, but for each section, please circle the one number which most closely describes your problem.

Pain intensity

- 0 I have no pain at the moment.
- 1 The pain is very mild at the moment.
- 2 The pain is moderate at the moment.
- 3 The pain is fairly severe at the moment.
- 4 The pain is very severe at the moment.
- 5 The pain is the worst imaginable at the moment.

Personal Care (Washing, dressing, etc.)

- 0 I can look after myself normally without causing extra pain.
- 1 I can look after myself normally but it causes extra pain.
- 2 It is painful to look after myself and I am slow and careful.
- 3 I need some help but manage most of my personal care.
- 4 I need help every day in most aspects of self-care.
- 5 I do not get dressed, I wash with difficulty and stay in bed.

Lifting

- 0 I can lift heavy weights without extra pain.
- 1 I can lift heavy weights but it gives extra pain.
- 2 Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example, on a table.
- 3 Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- 4 I can lift very light weights.
- 5 I cannot lift or carry anything at all.

Reading

- 0 I can read as much as I want to with no pain in my neck.
- 1 I can read as much as I want to with slight pain in my neck.
- 2 I can read as much as I want to with moderate pain in my neck.
- 3 I can't read as much as I want because of moderate pain in my neck.
- 4 I can hardly read at all because of moderate pain in my neck.
- 5 I cannot read at all.

Headaches

- 0 I have no headaches at all.
- 1 I have slight headaches which come infrequently.
- 2 I have moderate headaches which come infrequently.
- 3 I have moderate headaches which come frequently.
- 4 I have severe headaches which come frequently.
- 5 I have headaches almost all the time.



Concentration

- 0 I can concentrate fully when I want to with no difficulty.
- 1 I can concentrate fully when I want to with slight difficulty.
- 2 I have a fair degree of difficulty in concentrating when I want to.
- 3 I have a lot of difficulty in concentrating when I want to.
- 4 I have a great deal of difficulty in concentrating when I want to.
- 5 I cannot concentrate at all.

Work

- 0 I can do as much work as I want to.
- 1 I can do my usual work, but no more.
- 2 I can do most of my usual work but no more.
- 3 I cannot do my usual work.
- 4 I can hardly do any work at all.
- 5 I can't do any work at all.

Driving

- 0 I can drive my car without any neck pain.
- 1 I can drive my car as long as I want with slight pain in my neck.
- 2 I can drive my car as long as I want with moderate pain in my neck.
- 3 I can't drive my car as long as I want because of moderate pain in my neck.
- 4 I can hardly drive at all because of severe pain in my neck.
- 5 I can't drive my car at all.

Sleeping

- 0 I have no trouble sleeping.
- 1 My sleep is slightly disturbed (less than 1 hr. sleepless).
- 2 My sleep is mildly disturbed (1-2 hrs. sleepless).
- 3 My sleep is moderately disturbed (2-3 hrs. sleepless).
- 4 My sleep is greatly disturbed (3-5 hrs. sleepless).
- 5 My sleep is completely disturbed (5-7 hrs. sleepless).

Recreation

- 0 I am able to engage in all my recreation activities with no pain in my neck.
- 1 I am able to engage in all my recreation activities with some pain in my neck.
- 2 I am able to engage in most, but not all, of my recreation activities because of pain in my neck.
- 3 I am able to engage in only a few of my usual recreation activities because of pain in my neck.
- 4 I can hardly do any recreation activities because of pain in my neck.
- 5 I can't do any recreation activities at all

*Low Back Disability Questionnaire*

*Section B – Lower back pain.* These questions have been designed to enable us to understand how much your current condition has affected your ability to manage your everyday activities. Mark in each section only the one number which applies to you. We realize that you may feel that more than one statement relates to you, but for each section, please circle the one number which most closely describes your problem.

Sitting

- 0 I can sit in any chair as long as I like
- 1 I can sit only in my favorite chair as long as I like
- 2 Pain prevents me from sitting more than 1 hour
- 3 Pain prevents me from sitting more than 30 minutes
- 4 Pain prevents me from sitting more than 10 minutes
- 5 I avoid sitting because it increases pain right away

Pain Intensity

- 0 The pain comes and goes and is very mild
- 1 The pain is mild and does not vary much
- 2 The pain comes and goes and is moderate
- 3 The pain is moderate and does not vary much
- 4 The pain comes and goes and is very severe
- 5 The pain is severe and does not vary much

Personal Care (Washing, dressing, etc.)

- 0 I would not have to change my way of washing or dressing in order to avoid pain
- 1 I do not normally change my way of washing or dressing even though it causes me some pain
- 2 Washing and dressing increases the pain but I manage not to change my way of doing it
- 3 Washing and dressing increases the pain and I find it necessary to change my way of doing it
- 4 Because of the pain I am unable to do some washing and dressing without help
- 5 Because of the pain I am unable to do any washing and dressing without help

Lifting

- 0 I can lift heavy weights without extra pain
- 1 I can lift heavy weights but it causes extra pain
- 2 Pain prevents me from lifting heavy weights off the floor but I can manage if they are conveniently positioned, e.g. on a table
- 3 Pain prevents me from lifting heavy weights off the floor
- 4 Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned
- 5 I can only lift very light weights at the most

Walking

- 0 I have no pain on walking
- 1 I have some pain on walking but it does not increase with distance
- 2 I cannot walk more than one mile without increasing pain
- 3 I cannot walk more than ½ mile without increasing pain
- 4 I cannot walk more than ¼ mile without increasing pain
- 5 I cannot walk at all without increasing pain

Standing

- 0 I can stand as long as I want without pain
- 1 I have some pain on standing but it does not increase with time
- 2 I cannot stand for longer than one hour without increasing pain
- 3 I cannot stand for longer than 30 minutes without increasing pain
- 4 I cannot stand for longer than 10 minutes without increasing pain
- 5 I avoid standing because it increases the pain right away

Sleeping

- 0 I don't get pain in bed
- 1 I get pain in bed but it does not prevent me from sleeping well
- 2 Because of pain my normal nights sleep is reduced by less than  $\frac{1}{4}$
- 3 Because of pain my normal nights sleep is reduced by less than  $\frac{1}{2}$
- 4 Because of pain my normal nights sleep is reduced by less than  $\frac{3}{4}$
- 5 Pain prevents me from sleeping at all

Social Life

- 0 My social life is normal and gives me no pain
- 1 My social life is normal but increases the degree of my pain
- 2 Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g. dancing, etc.
- 3 Pain has restricted my social life and I do not go out very often
- 4 Pain has restricted my social life to my home
- 5 I have hardly any social life because of the pain

Traveling

- 0 I get no pain while traveling
- 1 I get some pain while traveling but none of my usual forms of travel make it any worse
- 2 I get extra pain while traveling but it does not compel me to seek alternative forms of travel
- 3 I get extra pain while traveling which compel me to seek alternative forms of travel
- 4 Pain restricts all forms of travel
- 5 Pain prevents all forms of travel except that done lying down

Changing Degree of Pain

- 0 My pain is rapidly getting better
- 1 My pain fluctuates but is definitely getting better
- 2 My pain seems to be getting better but improvement is slow at present
- 3 My pain is neither getting better nor worse
- 4 My pain is gradually worsening
- 5 My pain is rapidly worsening